

HAER
IOWA
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HAER No. IA-65

EVELAND BRIDGE
(Wilson's Ferry Bridge)
(Des Moines River Bridge)
Iowa Bridges Recording Project
Spanning Des Moines River at 285th Street
Oskaloosa Vicinity
Mahaska County
Iowa

BLACK & WHITE PHOTOGRAPHS
WRITTEN HISTORICAL & DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Department of the Interior
P.O. Box 37127
Washington, D.C. 20013-7127

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Location: Spanning the Des Moines River at 285th Street; 6.8 miles southwest of Oskaloosa; Mahaska County, Iowa
UTM: 15.520430.4565525
USGS: Buxton, Iowa quadrangle
(7.5 minute series, 1982)

Date of Construction: 1876-77

Designer/Contractor: McKay & Nelson, Fort Wayne, Indiana

Present Owner: Mahaska County, Iowa

Present Use: Abandoned

Significance: The Eveland Bridge is a rare example of a multiple-span Whipple truss bridge. A less common variation on the Pratt truss, the Whipple truss was seldom used for wagon trusses in Iowa, and only seven remain today. Spanning the Des Moines River, the Eveland Bridge was the primary connection for southwest Mahaska County and played a major role in county commerce for decades after its erection.

Historian: Leslie Pitner, August 1995

Project Information: This document was prepared as a part of the Iowa Historic Bridges Recording Project performed during the summer of 1995 by the Historic American Engineering Record (HAER). The project was sponsored by the Iowa Department of Transportation (IDOT). Preliminary research was performed by Clayton B. Fraser of Fraserdesign, Loveland, Colorado.

INTRODUCTION

The Eveland Bridge, a 4-span wrought-iron Whipple truss crossing the Des Moines River, spanned a natural barrier that had isolated the southwest corner of Mahaska County since its settlement. Such a bridge had long been the hope of the residents of Jefferson Township, who had to rely on ferries to connect them to the rest of the county. After receiving citizens' petitions from time to time urging the county to replace the ferry with a permanent bridge, the county board of supervisors finally agreed in April 1875 to undertake the bridge's construction, provided that a sufficient local subscription of funds could be raised. In June 1876 the supervisors solicited competitive bids, based on a design by county engineer C.W. Tracy; in September they awarded a contract to fabricate and build the multiple-span iron structure to McKay and Nelson.¹ A Fort Wayne crew worked on the massive stone piers through the winter and following spring, and completed the 647' bridge in the summer of 1877, at a final cost of \$25,200.² The Eveland Bridge functioned as a regionally important crossing for almost 90 years before its closure in the 1960s. It now stands abandoned, with the deck and stonework deteriorating, but the superstructure intact.

BACKGROUND

After receiving statehood in 1846, Iowa received a flood of settlers to occupy this fertile land. The population tripled between 1850 to 1860, and continued to more than double in the next decade.³ With the influx of settlers from the eastern areas of the United States and from Europe, the amount of cultivated land grew to 36 million acres by 1880.⁴ As the railroads began to arrive in the 1860s and 70s, the infrastructure was set to move Iowa's produce to outside markets. This growth also created the continual need for new and improved roadways to move crops and livestock to local railroad depots.

¹Mahaska County Board of Supervisors Minutes, 16 June 1876 (Book 1: p. 529), 6 September 1876 (1:531), 9 September 1876 (1:532), 30 September 1876 (1:544).

²The History of Mahaska County, its cities, towns, etc., (Des Moines: Union Historical Company, 1878), 311.

³Leland L. Sage, A History of Iowa, (Ames, Iowa: The Iowa State University Press, 1974), 92.

⁴Joseph Frazier Wall, Iowa: A Bicentennial History, (New York: W.W. Norton & Company, Inc., 1978), 127.

Iowa is graced by dozens of rivers and streams. While these waterways supported its transformation from a frontier, they also created the need for thousands of bridges, both large and small. These rivers, creeks, and streams had to be spanned to facilitate Iowa's growing agricultural commerce. The railways which brought settlers in and took out Iowa's produce became the vehicle for the solution to spanning these streams. With the railroads came the resources to begin building longer span iron truss bridges.⁵

MAHASKA COUNTY

In 1842, the U.S. Government bought the territory of Iowa from the Sauk and Fox tribes, of which Mahaska County was a part.⁶ The Indians were to vacate the land by May of 1843, and in the weeks before the Indians' title expired, settlers began to gather to stake claims in the new territory. In 1843, a flood of settlers made their claims. In 1844, the Territorial Legislature passed the organization for Mahaska and other counties, and in the same year, the County Commissioners laid out the county seat, Oskaloosa.⁷ The county is named for the famous chief of the Ioway tribe, from which the state takes its name.⁸

Mahaska County is in the fourth row of counties west of the Mississippi River and covers 576 square miles. Five creeks or rivers cross the county - North Skunk River, Middle Creek, South Skunk River, Muchakinock Creek, and the Des Moines River. As stated in the 1878 county history: "Few counties have been called upon for larger expenditure for bridges than Mahaska. Crossed as the county is by three large streams and a number of smaller ones, the expense of building and maintaining bridges has been considerable."⁹ The Des Moines is the largest river in Mahaska County, and one of the major rivers of the state of Iowa. It

⁵Carl W. Condit, American Building, (Chicago: The University of Chicago Press, 1968), 93-4.

⁶Sage, 72-3.

⁷The History of Mahaska County, its cities, towns, etc., (Des Moines: Union Historical Company, 1878), 2-3.

⁸Sage, 24.

⁹The History of Mahaska County, 311.

winds through the southwest corner of the county, and even today, only three bridges in the county cross the river.¹⁰

The Eveland Bridge is located in the northeast corner of Jefferson Township, where the Des Moines River cuts through the township. The township was essentially cut off from the rest of the county by the Des Moines River. Crossing the river required either difficult fording or an expensive ferry ride. During the 1870s, the people of the township began submitting petitions to the County Board of Supervisors, requesting a bridge across the Des Moines. As the Oskaloosa Herald stated in 1872: "It is argued by them that having been taxed to assist in constructing several bridges over the Skunk rivers, it is no more than simple justice that they be served now with as good as they gave."¹¹ The petitions also asserted that the bridge was good business for Oskaloosa, as the farmers went to Albia in Monroe County or Eddyville in Wapello County for trade rather than pay to cross the Des Moines River on the ferry.¹² The erection of the Eveland Bridge was an immediate boon to the county economy as the residents of Jefferson Township began to do business in Oskaloosa. As stated in the 1878 county history, "This bridge has brought in direct and convenient communication the southwestern part of the county with the county seat and surrounding county - an advantage and improvement worth twice the money expended."¹³

SQUIRE WHIPPLE AND THE DEVELOPMENT OF THE IRON TRUSS

Configured as a pin-connected Whipple (or double-intersection Pratt) through truss, the Eveland Bridge is one of only seven such structures known to exist in Iowa. The Eveland Bridge consists of four spans, three 164' Whipple trusses and one 164' Pratt truss, which was a replacement span built in 1903. The original span was lost in a flood and a replacement was built by a local firm, Seevers Manufacturing.¹⁴ The upper chords and

¹⁰The History of Mahaska County, Iowa, (Dallas: Curtis Media Corporation, 1984), 2.

¹¹"The County in Which We Live: Jefferson Township," Oskaloosa Herald, 27 June 1872.

¹²"The County in Which We Live."

¹³History of Mahaska County, 1878, 311.

¹⁴"Bridge Finished," Oskaloosa Herald, April 21, 1904. For more information on Seevers Manufacturing, see HAER Report IA-66, "Middle Creek Bridge."

inclined end posts are two channels with cover and batten plates. The lower chord is 2-4 looped rectangular eyebars. The verticals consist of built-up I-beams and the diagonals are two looped rectangular eyebars. The hip blocks and bearing shoes are of cast iron. The portal is a lattice design with cast-iron knee braces.

Squire Whipple, the developer of the Whipple truss, is a pivotal figure in the development of the iron truss bridge in the United States. Trained as an engineer at Union College, where he received a bachelor's degree in 1830, he was the first American engineer to rationalize the analysis of iron trusses.¹⁵ Whipple began his career as a surveyor, first for the Baltimore and Ohio Railroad, and later for the New York State Canal System. While working for the Canal System, he built his first cast-iron arch truss. In 1841, he obtained a patent for a cast-iron bowstring arch-truss.

In 1847, Whipple published A Work on Bridge Building, the first book in America to apply scientific methods to measure the stresses of trusses. This same year, he patented his parallel chord truss, of which the Hardin City Bridge is an example. Whipple described this development:

Prior to 1846, or thereabouts, I had regarded the arch-formed truss as probably, if not self-evidently, the most economical that could be adopted; and at about that time I undertook some investigations and computations with the expectation of being able to demonstrate such to be the fact, but on the contrary the result convinced me that the trapezoidal form, with parallel chords and diagonal members, either with or without verticals, was theoretically more economical than the arch, and that the trapezoid was more economical *without than with* vertical members—there being shown a less amount of action (sum of maximum strains into lengths of respective long members) under a given load.¹⁶

¹⁵Eric DeLony, "Surviving Cast- and Wrought-Iron Bridges in America," IA: The Journal of the Society for Industrial Archeology, 19:2 (1993), 28.

¹⁶Squire Whipple, "The Development of the Iron Bridge," Railroad Gazette, April 19, 1889, 253.

The truss Whipple developed was a variation on the Pratt truss, which had been patented by Thomas Pratt in 1844. The Pratt truss is a trapezoidal form with vertical compression members and diagonal tension members. The Whipple truss differed from the more common Pratt in that its diagonal members extended across not one, but two panels. Although more costly, this variation best braced the horizontal plane, distributed stresses, and had greater overall strength.¹⁷

The Whipple truss was a popular choice for long-span crossings between 1865 and 1890, most often used for spans over 150'. By the turn of the century, Parker and Camelback trusses (Pratt variants with polygonal upper chords) had supplanted the Whipple as the truss of choice for longer span crossings. Accordingly, all of Iowa's extant Whipples date from before that time.¹⁸ The Eveland Bridge is distinguished among these as a large-scale example of the Whipple through truss.

MCKAY AND NELSON

Little is known about the firm of McKay and Nelson of Fort Wayne, Indiana. John A. McKay began building timber bridges during the 1860s as an associate of Alpheus Wheelock.¹⁹ By the 1870s, McKay had his own business with a series of partners. In 1870, McKay was a railroad contractor with William H. Myers. McKay teamed with J.S. Goshorn, who held a patent on a bridge pier, as railroad and bridge contractors in 1872. During 1874-5, McKay worked alone as a bridge contractor. In 1876, McKay began his partnership with William Nelson. By 1880, McKay was once again independent, and seems to have left Fort Wayne by the mid-1880s.²⁰

Fort Wayne, Indiana was a railroad center, and during the Civil War, developed the iron industry to support the railways. Large iron foundries manufactured rail equipment, and Fort Wayne was

¹⁷Condit, 98-9.

¹⁸Fraserdesign, MAHA03 "Eveland Bridge," Iowa Historic Bridge Inventory, prepared for the Iowa Department of Transportation, 1993.

¹⁹George E. Gould, Indiana Covered Bridges thru the Years, (Indianapolis: Indiana Covered Bridge Society, 1977), 18. Wheelock went on to establish Western Bridge Works with C.L. Olds in 1870s.

²⁰Fort Wayne City Directories, 1870-85, held at Allen County Library, Fort Wayne, Indiana.

home to the world's largest supplier of railroad wheels and axles.²¹ Fort Wayne also lies on the border of Ohio, the home of many of the largest and most prolific bridge building firms. The local iron resources and examples of the successful Ohio companies could have inspired McKay to begin building iron truss bridges. After the Depression of 1873, however, the competition among bridge contractors became fierce. The economic slump lasted until 1880, and McKay and his partners must have been a casualty of slow business and high competition. The Eveland Bridge stands as perhaps the only reminder of the firm.

For its exceedingly rare use of wrought and cast-iron components and Whipple truss configuration, the Eveland Bridge is one of the most significant wagon crossings in Iowa. It also stands as one of the earliest permanent bridges across the Des Moines River, one vital to the economic development of Mahaska County. While the bridge is now closed and deteriorated, the Eveland Bridge is an important relic of the growth of Iowa.

²¹John Ankenbruck, The Fort Wayne Story: A Pictorial History (Woodland Hills, California: Windsor Publications, Inc., 1980) 71-2.

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This appendix is an addendum to a 8-page report previously transmitted to the Library of Congress.

APPENDIX: ADDITIONAL REFERENCES

Interested readers may consult the Historical Overview of Iowa Bridges, HAER No. IA-88: "This historical overview of bridges in Iowa was prepared as part of Iowa Historic Bridges Recording Project - I and II, conducted during the summers of 1995 and 1996 by the Historic American Engineering Record (HAER). The purpose of the overview was to provide a unified historical context for the bridges involved in the recording projects."